Wind tunnel scale and plasma for nano materials

A bulk scale nanomaterials production facility has been commissioned by QinetiQ, which last year set up its subsidiary QinetiQ Nanomaterials to develop bulk nanometric materials capabilities at Farnborough.

Believed to be the the UK's first volume production facility dedicated to specialist nano materials, the facility, formerly a redundant wind tunnel, comprises the two production rigs each capable of achieving up to several kilos of material an hour, office space and ample room for production expansion and storage.

Much of the production process and plant has been developed and built under exclusive licence and in consultation with Oxfordshire based Tetronics Ltd. This plasma torch technology expert company has played a pivotal roll in defining and refining the nanometric production process, essential during the plants commissioning.

A variety of oxides and metal powders can be can produced, each with 'engineered' characteristics, which can have a commercial value between tens and several thousands of pounds per kilo.

"Bulk nano production for many countries is currently in the region of 100-200gms/day" says Dr Paul Reip, MD of QinetiQ Nanomaterials. "Here we have the capacity to produce at kg/hr or a couple of tons a year."

Dr Reip, explains that the company is currently looking at over 25 nano material projects (none in the compound sector as yet) with the dual aim of foundry material sales, but equally the all important creation of new IP for license.

QinetiQ Nano is a pioneer of the plasma vaporisation process where feed-stock material is fed into a high temperature plasma (typically in the temperature range 4,000°C and 9,000°C) which acts as a clean heat source. Feed-stock material is vaporised on contact with the plasma and carried away from the hot zone on a gas stream. Rapidly quenched; the material condenses and solidifies to form nanometer sized powder particles, which are carried through to a collection system. By controlling the process parameters, a range of materials can be produced in a variety of particle sizes. Pure metals, passivated metals (with a thin oxide layer), oxides, nitrides and other alloys and compounds can be produced.

Dr Reip added that QinetiQ Nanomaterials has opened a representative office in Tokyo, seen as crucial to maintaining local contacts and developing strong relationships in this growing market.

Unequitable league

Wide disparities between the various EU countries emerge over the acceptance of private equity. On a scale of 1 (very favourable) to 3 (very unfavourable) Britain is at the top, ranking 1.20 while Austria, ranking 2.53, is at the bottom. The European Private Equity and Venture Capital Association has published this league table. Its ranking is based on ten criteria which include merger regulation, tax, fiscal incentives forR&D, pension funds' investment freedom and others.

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The European Union Private Equity League table

Rank:	Country:	Score:
1	Britain	1.20
2	Ireland	1.58
3	Luxembourg	1.67
4	Netherlands	1.79
5	Italy	1.96
6	Greece	1.96
7	France	2.09
8	Sweden	2.09
9	Belgium	2.14
10	Spain	2.17
11	Finland	2.25
12	Portugal	2.32
13	Germany	2.41
14	Denmark	2.48
15	Austria	2.53

Source: European Private Equity and Venture Capital Association

Funding for Kamelian

UK Kamelian Ltd, the former Scottish startup, now Oxford based, has won a $6.7m round of new funding involving its existing investors 3i, Goldman Sachs and Lightspeed, as well as from new strategic investor Hoya. The $6.7m financing provides the company with sufficient capital to break-even in 2005.

Paul May, Kamelian's CEO, says the latest funding was conditional on a new strategic investor. (See feature page 40). This sizeable Japanese company is probably better known for the optics used in compact disc drives, eye care, and medical equipment. It has been quietly investing in InP and companies with expertise in integrating active and passive components on a single optical chip.

Back in January, it led a $3m round for LA based Optimetrics which uses innovative glass platform technology to facilitate the integration of active and passive components on a single optical chip with advanced functionalities. This reduces the complexity to manufacture optical components by eliminating the costly deposition and etching methods delivering a significant shift in the cost/performance characteristics of planar lightwave circuits.

Now Hoya with an interest in InP has put money into Kamelian, which offers InP foundry services and specialises in "hybrid integration" - making semiconductor optical amplifiers (SOAs) in InP bonding those to the waveguides on either side in silica to create a single chip. This uses technology that automates the alignment, Kamelian's key to reducing production costs. Kamelian is already reported to be investigating non-telecom applications for further developments.